CLAIMS

1.   (Amended)   A method for processing a signal, the method comprising the steps of:

dividing the signal into frames, each frame having a corresponding spectrum;

selecting a plurality of pitch candidates from a first frame;

selecting a plurality of pitch candidates from a second frame;

selecting a plurality of pitch candidates from a third frame;

calculating a cumulative error function for a plurality of paths, each path including a pitch candidate from the first frame ~~and~~ , a pitch candidate from the second frame, and a pitch candidate from the third frame;

selecting a path corresponding to a low cumulative error function;

basing a pitch estimate for a current frame on the selected path;

using the pitch estimate for the current frame to process the signal.

2.   (Canceled).

3.   (Original) The method of claim 1 wherein the first frame is a previous frame and the second frame is a current frame.

4.   (Original) The method of claim 1 wherein the first frame is a current frame and the second frame is a future frame.

5.   (Original) The method of claim 1 wherein the plurality of pitch candidates for the first frame is no more than five pitch candidates and the plurality of pitch candidates for the second frame is no more than five pitch candidates.

6.   (Original) The method of claim 5 wherein a cumulative error function is calculated for all possible paths.

7.   (Original) The method of claim 1 wherein the selected pitch candidates for the first and second frames have low error functions.

8.   (Original) The method of claim 7 wherein the error function is a measure of the spectral error between original and synthesized spectra.

9.   (Canceled).

10.   (Amended) The method of ~~claim 9~~ claim 1 wherein the plurality of pitch candidates for the first frame is no more than five pitch candidates, the plurality of pitch candidates for the second frame is no more than five pitch candidates and the plurality of pitch candidates for the third frame is no more than five pitch candidates.

11.   (Original) The method of claim 10 wherein a cumulative error function is calculated for all possible paths.

12.   (Amended) The method of ~~claim 9~~ claim 1 wherein the first frame is a previous frame, the second frame is a current frame and the third frame is a future frame.

13.   (Amended) The method of ~~claim 9~~ claim 1 wherein the selected pitch candidates for the first, second and third frames have low error functions.

14.   (Original) The method of claim 13 wherein the error function is a measure of the spectral error between original and synthesized spectra.

15.   (Original) The method of claim 14 wherein a cumulative error function for each path is defined by the equation:

$$CF = k * (E_{-1} + E_{-2}) + \log (P_{-1} / P_{-2}) + k * (E_{-2} + E_{-3}) + \log(P_{-2} / P_{-3})$$

wherein P_{-1} is a selected pitch candidate for the first frame, P_{-2} is a selected pitch candidate for the second frame, P_{-3} is a selected pitch estimate for the third frame, E_{-1} is an error for P_{-1}, E_{-2} is an error for P_{-2}, E_{-3} is an error for P_{-3}, and k is a penalising factor.

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16.   (Amended) The method of ~~claim 9~~ claim 1 wherein the basing a pitch estimate for a current frame on the selected path step further comprises calculating a backward pitch estimate along the selected path, wherein the pitch estimate for a current frame is based on the selected path and the backward pitch estimate.

17.   (Original) The method of claim 16 wherein the backward pitch estimate is calculated by calculating backward sub-multiples of a pitch candidate for the second frame in the selected path, determining whether the backward sub-multiples satisfy backward constraint equations, and selecting a low backward sub-multiple as the backward pitch estimate wherein the pitch candidate for the second frame in the selected path is selected as the backward pitch estimate if a backward sub-multiple does not satisfy the backward constraint equations.

18.   (Original) The method of claim 17 wherein the basing a pitch estimate for a current frame on the selected path step further includes determining a backward cumulative error based on the backward pitch estimate.

19.   (Original) The method of claim 18, wherein the backward cumulative error is defined by:

$$CE_B(P_B) = E(P_B) + E_{-1}(P_{-1})$$

wherein $E(P_B)$ is an error of the backward pitch estimate and $E_{-1}(P_{-1})$ is an error of the first pitch candidate.

20.   (Amended) The method of ~~claim 9~~ claim 1 wherein the basing a pitch estimate for a current frame on the selected path step further comprises calculating a forward pitch estimate along the selected path, wherein the pitch estimate for a current frame is based on the selected path and the forward pitch estimate.

21.   (Original) The method of claim 20 wherein the forward pitch estimate is calculated by calculating forward sub-multiples of a pitch candidate for the second frame in the selected path, determining whether the forward sub-multiples satisfy forward constraint

equations, and selecting a low forward sub-multiple as the forward pitch estimate wherein the pitch candidate for the second frame in the selected path is selected as the forward pitch estimate if a forward sub-multiple does not satisfy the forward constraint equations.

22.   (Original) The method of claim 21 wherein the forward constraint equation is selected from the group consisting of:

$$CE_F(P_0 / n) \leq 0.85 \text{ and } (CE_F(P_0 / n)) / (CE_F(P_0)) \leq 1.7;$$

$$CE_F(P_0 / n) \leq 0.4 \text{ and } (CE_F(P_0 / n)) / (CE_F(P_0)) \leq 3.5; \text{ and}$$

$$CE_F(P_0 / n) \leq 0.5$$

where P_0 / n refers to forward sub-multiples, P_0 refers to the pitch candidate for the second frame in the selected path, and $CE_F(P)$ is an error function.

23.   (Original) The method of claim 21 wherein the basing a pitch estimate for a current frame on the selected path step further includes determining a forward cumulative error based on the forward pitch estimate.

24.   (Original) The method of claim 23, wherein the forward cumulative error is defined by:

$$CE_F(P_F) = E(P_F) + E_{-1}(P_{-1})$$

wherein $E(P_F)$ is an error for the forward pitch estimate and $E_{-1}(P_{-1})$ is an error of the first pitch candidate.

25.   (Original) The method of claim 24 wherein the basing a pitch estimate for a current frame on the selected path step further comprises calculating a backward pitch estimate along the selected path, wherein the backward pitch estimate is used to calculate a backward cumulative error, the pitch estimate being based on the selected path, the forward cumulative error and the backward cumulative error.

26.   (Original) The method of claim 25, wherein the basing a pitch estimate for a current frame on the selected path step further comprises comparing the forward and backward cumulative errors with one another, selecting the pitch estimate as the forward pitch estimate if

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the forward cumulative error is less than the backward cumulative error, and selecting the pitch estimate as the backward pitch estimate if the backward cumulative error is less than the forward cumulative error.

27.   (Original) The method of claim 20 wherein the basing a pitch estimate for a current frame on the selected path step further comprises calculating a backward pitch estimate along the selected path, wherein the pitch estimate for a current frame is based on the selected path, the forward pitch estimate and the backward pitch estimate.

28.   (Original) A method for processing a signal comprising the steps of:

dividing the signal into frames;

obtaining a pitch estimate for a current frame;

refining the obtained pitch estimate comprising the sub-step of:

computing backward and forward sub-multiples of the obtained pitch estimate for the current frame;

determining whether the backward sub-multiples satisfy at least one backward constraint equation;

determining whether the forward sub-multiples satisfy at least one forward constraint equation;

selecting a low backward sub-multiple that satisfies the at least one backward constraint equation as the backward pitch estimate, wherein the obtained pitch estimate of the current frame is selected as the backward pitch estimate if a backward sub-multiple does not satisfy the at least one backward constraint equation;

selecting a low forward sub-multiple that satisfies the at least one forward constraint equation as the forward pitch estimate, wherein the obtained pitch estimate of the current frame is selected as the forward pitch estimate if a forward sub-multiple does not satisfy the at least one forward constraint equation;

using the backward pitch estimate to compute a backward cumulative error;

using the forward pitch estimate to compute a forward cumulative error;

comparing the forward cumulative error to the backward cumulative error;

refining the chosen pitch estimate for the current frame based on the comparison; and

using the refined pitch estimate for the current frame to process the signal.

Claims 29-79 are canceled.